REMARKS

Claims 24-46 were rejected under 35 USC §112, second paragraph.

Claims 24-28, 33, 37-38, 40-41, and 43-44 were rejected under 35 USC 103(a) and being unpatentable over Wild et al. (US 6,352,065) in view of Fujimoto et al. (US 4,485,625).

Claims 29-33, 39, and 42 were rejected under 35 USC 103(a) and being unpatentable over Wild et al. (US 6,352,065) in view of Fujimoto et. al. (US 4,485,625) and in further view of Yahata et al. (US 8,826,903).

Claim 34 was rejected under 35 USC 103(a) and being unpatentable over Wild et al. (US 6,352,065) in view of Fujimoto et. al. (US 4,485,625) , and in further view of Treinies et al. (US 5,974,870).

Claims 35-36 and 45-46 were rejected under 35 USC 103(a) and being unpatentable over Wild et al. (US 6,352,065) in view of Fujimoto et. al. (US 4,485,625), and in view of Mark's Standard Handbook for Mechanical Engineers.

Claims 1-23, 25, 33, 38, and 43 have been canceled.

Claims 24, 26-32, 34-37, 39-42 and 44-46 remain active in the application.

With regards to the 35 USC 112 rejections

Applicant has amended the relevant claims to more clearly identify the claimed elements/components and functions. The phrases presented as being indefinite in the 35 USC 112, second paragraph rejections by the Examiner have been revised or eliminated as applicable.

With regards to the 35 USC 112 rejection of claim 32

The phrase "the exhaust gas cooler being designed as an engine or transmission oil heat exchanger respectively" is disclosed in the Specification at page 6, line 5-12 and also at page 16, lines 10-19, where applicant explains the exhaust gas cooler can be arranged within an existing engine cooling circuit, rather than being provided as an independent cooling circuit. Examples of known existing engine cooling systems include engine oil cooling systems as well as transmission oil cooling systems. Where there are existing cooling subsystems within the vehicle, one of ordinary skill could readily expand the present invention to control the cooling

requirements of those vehicle cooling subsystems including the engine oil cooling and transmission oil cooling.

With regards to the 35 USC 112 rejection of the phrase "an earlier combustion cycle"

The phrase "an earlier combustion cycle", as applied to the present active claims, is not indefinite because within the art of internal combustion engines, it is generally well known that exhaust gas is produced in a continuous process cycle as a stream of fuel/gas is combusted into exhaust gas, so that to have exhaust gas for feeding into an incoming air/fuel mixture, an earlier combustion cycle inherently must have taken place.

Amended claims not obvious over cited references

Independent claims 24 and 37 have been amended to include elements and operational functionality not disclosed or obvious in view of the cited references.

The instant invention presents an integrated system and method for influencing the induction gas temperature and thereby by the energy level in the combustion chamber of an internal combustion engine, especially of an HCCI-enabled internal combustion engine, through which setting the temperature in the combustion chamber can be decoupled, at least partly, from setting the optimum mixture ratio of air, fuel, and exhaust gas.

Most significantly, amended claims 24 and 37 provide a control/regulation/computation device which uses measured values, set-point values, and the temperature increase of the fresh air from T_1 to T_2 to explicitly influence the combustion chamber temperature by controlling the heat flow to the combustion chamber and thereby the energy level in the combustion chamber.

As shown in Figures 2 and 4, the control/regulation/computation device 34, includes a first device 38 for calculating a required exhaust gas temperature, and a second device 40 connected to the first device 38, wherein the second device 40 calculates coolant flow-through in the exhaust gas cooler 32, and the second device 40 is connected via a coolant flow regulation path to a coolant flow controller 44, see Specification page 18, lines 14-24.

Importantly, as shown in Figure 4, among other calculations and engine parameter sensing, the instant invention simultaneously uses the set-point value indicating the temperature of the induced/fresh air (TIA_IM_SP) at the intake manifold both when calculating the required exhaust gas temperature (T_EGR_DOWN_SP) and also when determining the coolant through-

flow correction value (AM_COOL/ΔM_COOL). This allows setting the temperature in the combustion chamber in a decoupled manner where the coolant conditions in the cooling system are analyzed, conditioned, and regulated in a specialized subsystem. The simultaneous application of the induced/fresh air set-point value to calculating the required exhaust gas temperature AND to determining the coolant through-flow correction value provides for very fine variations in the adjustment of the energy levels in the combustion chamber because the system closely controls the heat and energy exchange in the re-circulated exhaust gas by using a common set-point variable (the induced fresh/air temperature). The instant invention uniquely links the properties of the induced fresh air with the properties of the recirculated exhaust gas by applying a set-point value in a manner distinct from the cited references.

<u>The combined cited references Wild et al. and Fujimoto et al. do not render obvious the instant invention's combination of temperature sensor and control/regulation/computation device</u>

As stated in Examiners Office Action, Wild et al. fails to disclose the temperature sensor of the instant invention. Wild et al. relies on various mass flow analyses and applies various temperature weighting factors as an alternate to using the temperature sensor of the instant invention. These mass flow analysis and weighting factors do not anticipate the induced/fresh air set-point values of the instant invention and are not applied to a control/regulation/computation device to determine the coolant through-flow correction value as recited in the instant invention.

The cited reference Fujimoto et al. provides an intake gas temperature sensor, however it does not combine the temperature sensor data of the temperature increase of the fresh air from T_1 to T_2 to explicitly influence the combustion chamber temperature via a control/regulation/computation device as recited in the instant invention.

Applicant's amended claims 24 and 37 include a coolant flow regulation path connected to a coolant flow controller and integrated with a control/regulation/computation device which not disclosed in either Wild et al. or Fujimoto et al. The coolant flow/ control/regulation/computation device integration is significant in that it provides precise control of the heat and energy in the re-circulated exhaust gas not possible in the Wild et al./Fujimoto et al. combination.

The additional references of Yahata et al. and Trennies et al. respectively present an exhaust gas cooler and associated components as well as an air/fuel temperature sensor and air mass or quantity measuring device from individual references, however these supplemental

components do not present the integrated system of the instant invention where the control/regulation/computation device integrates the various components into a system which uses measured values, set-point values, and the temperature increase of the fresh air from T_1 to T_2 to explicitly influence the combustion chamber temperature by controlling the heat flow to the combustion chamber and thereby the energy level in the combustion chamber.

Conclusion

Reconsideration and allowance of the amended application is respectfully requested. The commissioner is hereby authorized to charge any appropriate fees due in connection with this paper, or credit any overpayments to Deposit Account No. 19-2179.

Respectfully submitted,

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By: [signature]

John P. Musone
Registration No. 44,961
(407) 736-6449

Siemens Corporation
Intellectual Property Department
170 Wood Avenue South
Iselin, New Jersey 08830